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REMINISCENCES OF THE CHOLERA EPIDEMIC OF 1832:

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NOTES ON THE TREATMENT OF THE DISEASE AT THAT TIME.

BY HIRAM CORSON, M.D.,

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REMINISCENCES OF THE CHOLERA EPIDEMIC OF 1832.

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AS we are having reports that the Asiatic cholera now prevails in France, and judging from former experiences that it will probably visit this country before another year shall have passed away, it has occurred to me that some reminiscences of the disease as it prevailed here in 1832 may be interesting to those of our profession who have graduated since that time.

During the years 1830 and 1831 reports reached us that the disease was steadily advancing from Asia to Europe and across that country, and that it would doubtless reach America in its westward progress. We were informed, too, of its great fatality; yet it produced no great anxiety among physicians here, and none at all, apparently, among the people of our cities until it actually appeared in Canada. About the 1st of June, 1832, a Dutch ship arrived at Quebec, and on the 8th the disease appeared among the crew. It spread over the city with great rapidity, proving fatal to about two-thirds of all who were attacked. In two days (the 10th of June) it reached Montreal, distant one hundred and eighty miles. Here, as in Quebec, it spread rapidly, the deaths in three or four days being from 100 to 150 daily, though the population was only 25,000. The excitement in our cities became intense. In Philadelphia a meeting of physicians was called to take the subject under consideration, which resulted in the appointment of a committee of three or more to visit Quebec and Montreal to see the sick and confer with physicians there in relation to treatment. Professor Samuel Jackson, of the University of Pennsylvania, Dr. D. Francis Condie, and others, whom I have forgotten, composed the commission. While they are away on their mission of mercy, we will follow the disease as it sped from city to city and spread throughout the country. From Montreal it passed rapidly along the river to the towns bordering it,—to Lake Ontario, thence to Lake Erie, on to Detroit, then by Lake Superior

to the Mississippi and Missouri Rivers, seeming to prefer this great watercourse, though striking small towns and country places on either side along its borders many miles from its shores. The disease as it reached us, however, does not seem to have come from that direction.

It first showed itself in New York on June 24, and twelve days afterwards, in that city of 200,000 people, the daily mortality had not reached 20. The marked difference between its mortality there and in Montreal was doubtless owing to the thorough cleansing which the former city underwent after the appearance of the disease at Quebec, and to the universal avoidance of all supposed exciting causes.

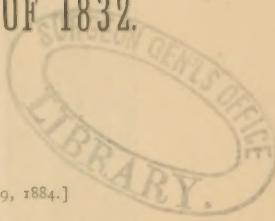
It did not occur in Albany at that time, the great half-way house between Montreal and New York, until five or six days after its appearance at the latter place.

Of its appearance in Philadelphia and in our county I have in my diary, from which much of the above has been condensed, the following:

“July 20.—The disease appeared in Philadelphia on the 5th of July, in a man named Musgrave, in Filbert Street, near Schuylkill Third Street [now Twentieth Street], and a few days later two men in a house in Coates Street [now Fairmount Avenue] were attacked.

“Now, nearly every case of disease to which I am called is of the stomach and bowels,—gripping, frequent purging of watery stools, and vomiting. Yesterday I was called to a case of cholera morbus of our usual kind, and to-day to two cases in one house; but in Philadelphia there are, it is said, 4 or 5 cases of real Asiatic cholera. In New York from 100 to 150 cases occur daily, with from 50 to 70 deaths.

“In Quebec and Montreal the disease is subsiding rapidly, for the *Montreal Gazette* of July 7 says, ‘The disease may now, after being with us thirty-eight days, be said to have left us, the deaths yesterday



from cholera being but seven,—not an unusual number for this season of the year.'"

"July 21.—During last week several cases occurred in New Jersey at great distances from each other. In one family of 5 persons, in a country place, 4 of them died in a few hours. (Newspaper report.)

"There has been no case reported in Philadelphia for three days past, and it is believed by some physicians that the cases previously reported were only cholera morbus."

"July 22.—Last Friday, 20th, there were 213 cases in New York, and 100 deaths. The disease has increased rapidly there during the past seven days.

"It is supposed that at least one-third of the inhabitants of the city have already left it for the country.

"Three hundred *women of the town* came from there to Philadelphia in the steamboat yesterday, and between two and three hundred a few days ago. (Fortunate Philadelphia!)

"Nearly all the small towns on the main route from New York to Philadelphia have been attacked during the past week.

"I was called, a few hours since, to a case of what I choose to call cholera morbus, in which there were severe cramps of the limbs, a symptom which I have not encountered in the cholera morbus of other years."

Readers of the *Times* must bear in mind that, at the time of which I speak, the communication between New York and Philadelphia was by one daily stage across New Jersey. It was often several days after events occurred there before we heard of them here: so my account of the progress made by the cholera there could not be recorded day by day, but it is, so far as it goes, mainly correct, and, as it may be interesting to know how rapidly and regularly it reached its height and declined, I give the following tables as they appeared at that time in the Health Reports of the two cities. In New York, up to July 22, 1600 persons had suffered from the cholera, 700 of whom had died.

July	23,	New Cases,	231;	Deaths,	73
"	24,	"	296	"	96
"	25,	"	157	"	61
"	26,	"	141	"	55
"	27,	"	122	"	46
"	28,	"	145	"	68
"	29,	"	122	"	38

July	30,	New Cases,	103;	Deaths,	38
"	31,	"	121	"	49
August	1,	"	92	"	41
"	2,	"	81	"	34
"	3,	"	90	"	24
"	4,	"	38	"	30
"	5,	"	96	"	29
"	6,	"	101	"	37
"	7,	"	89	"	32
"	8,	"	82	"	22
"	9,	"	73	"	28
"	10,	"	97	"	26
"	11,	"	76	"	33
"	12,	"	67	"	23
"	13,	"	105	"	23

This account, to the 13th of August, gives the number of seizures in New York as 4348, with 2756 deaths. The complete account, made after the disease had passed away, gave the seizures as 5381, with 2117 deaths during its continuance there.

This shows a milder disease or better treatment in New York than in Montreal, for New York was about eight times larger than Montreal, and yet at the latter place as many as 140 died in a single day, that being reached only once in the former city.

Philadelphia fared still better than either of the cities yet named. Although the first case was on July 5, yet until the 15th there were only 5 or 6 cases reported by the Board of Health, and from that time no report of any till the 28th of July, when they occurred as follows:

July	29,	New Cases,	6;	Deaths,	1
"	30,	"	15	"	7
"	31,	"	19	"	9
August	1,	"	20	"	9
"	2,	"	40	"	15
"	3,	"	35	"	14
"	4,	"	47	"	13
"	5,	"	125	"	43
"	6,	"	176	"	74
"	7,	"	137	"	73
"	8,	"	114	"	46
"	9,	"	154	"	58
"	10,	"	142	"	39
"	11,	"	126	"	33
"	12,	"	110	"	31
"	13,	"	130	"	49

My record ends with this date, and I give it here merely to show how it increased and diminished. Dr. Jackson, in his paper, made after ample time had elapsed for an accurate account, gives the population as 160,000, the seizures as 2314, deaths, 935. The cases were found in every part of the city. I have already spoken of the first case: the second and third were remote from it, in the Northern

Liberties, on July 9; in a few days, two more, near the last; then one away in Kensington, two miles from the first case; then a few scattered cases, until the 27th and 28th of July, when the epidemic swept on in full force.

In private practice there were 1175 cases, with 270 deaths; in hospitals, 874 cases and 342 deaths; in the old Almshouse, 174 cases and 92 deaths; in Arch Street Prison, 86 cases and 42 deaths.

Southwark and Northern Liberties, the suburbs nearly equidistant from Market Street, suffered nearly the same, while the city proper (not counting the old Almshouse and Arch Street Prison) was not so severely afflicted. In the first few cases which occurred, no communication could be traced to infected persons or districts.

Let us now return to New York, and see how the disease was brought there. On a close examination of this subject may depend our decision in relation to the value of quarantine measures. Sixteen days passed from its appearance in Quebec until it was found in New York, and before a single case occurred in the four hundred and fifty miles of country between the two places. Even Albany, the great resting-place for travellers, both by land and water, from Canada to New York, was still free from it when New York's first case occurred, in one of the old inhabitants, exempt from intercourse with the business people. Then three days more elapsed—nineteen days after its appearance in Montreal—before the second case occurred, in an old woman, an inmate of the Bellevue Almshouse, three miles from the city, who had been confined in the house for three years, and there was no possibility of tracing its immediate origin. From the Canadian cities it seemed to pass up the great lakes, and not down through the land-routes to the New England cities. Nearly all the towns on the seaboard from the St. Lawrence to Cape May were exempt. Except in very few cases, which occurred in Boston, Newport, New Haven, and Providence, all New England seemed to escape. The cases in Bellevue Almshouse were 530, with 298 deaths.

The following table, taken from Dr. Jackson's report (page 292 of the *American Journal of the Medical Sciences*, February, 1833), may be interesting:

	Population.	Cases.	Deaths.
Quebec,	32,000	5783	2118
Montreal,	28,000	4420	1904
New York,	140,000	5814	2935
Philadelphia, 160,000		2314	935

The disease, as already stated, did not occur in Albany for nearly a week after it appeared in New York. In all the places spoken of, the largest number of patients were found among the laboring poor, the intemperate, and those broken with toil, poverty, and distress.

By the time the Philadelphia Board of Health made its second report (July 28), the whole country was excited, and, as the bowel-affections incident to the season were evidently of a more active and severe kind than usual, we of the country were on the lookout for the dreaded visitant. In all the cities named, before the real Asiatic cholera occurred, there was a general prevalence of bowel-affections, from which comparatively few escaped. It was not uncommon to have, in addition to the diarrhoea, cramps and a sense of fatigue and tension in the calves of the legs.

During this time it was evident that we were here, at my home (fourteen miles from the centre of the city), feeling the approaches of the disease. On July 19 I had two severe cases of what I called cholera morbus,—fair specimens of cholerine, as given by Prof. Jackson; July 20, one case; July 22, one case; July 24 and 27, each one case. They were violent cases, attended by cramps of the legs in addition to the common symptoms; and, though we knew nothing of germs and germicides, had not heard of Pasteur or Koch, were ignorant of heart-clot, embolism, and septicæmia, they were all speedily cured by the use of calomel, and opium and camphor, aided by external irritants and fomentations, in some cases preceded by venesection. Lest my readers should be disgusted by the mere mention of this last-named means of cure, I will say more about it before I finish.

The situation was becoming serious. Exaggerated reports of its progress and fatality were passed from mouth to mouth, and doctors were appealed to for advice and encouragement. At that time, even here, on the very border of Philadelphia County, physicians were far apart. Each one of us had a large area of country, in which almost every family depended upon

his knowledge, skill, and faithfulness to duty. Much as we had desired and sought information in relation to the disease and its treatment during the two years in which its coming was heralded, we had learned but little concerning it. As the Commission had returned from Canada, and two of the most eminent physicians of Philadelphia—Dr. Joseph Parrish and Prof. Samuel Jackson, of the University of Pennsylvania—had established hospitals for the reception of patients, and as the cases coming to me almost daily gave evidence that we were within the range of the epidemic's influence, it seemed to me to be my duty to go to Philadelphia and see what treatment was in vogue there: so on the 31st of July a visit was made to the hospital of Dr. Parrish. His room was in Church Alley, between Front and Second and Arch and Market Streets. His son, Dr. Isaac Parrish, told me that they had begun a few days before with the cooling treatment,—washing the body with cold spirits, and giving ice or iced water to allay the insufferable demand for cold drink. But, as the patients had been brought in from the streets when far advanced, all their remedies had been in several cases of no avail. The two patients then before us were in a hopeless condition. They had been in there only since the night before. I had seen men exceedingly ill with cholera morbus, but had no conception before of the appearance of one in the deep collapse of Asiatic cholera. There they lay, cold and clammy all over the body, eyes sunken, pulseless, voice sunk to a whisper, body wasted and shrunken to a frightful degree, and, like the lips, of a blue tinge.

Dr. Jackson had pursued an opposite course,—had stimulated his patients and externally had used hot vapor steam-baths. He had been as unsuccessful as Dr. Parrish. Both of these eminent men soon fell back on their previous knowledge of the action of medicines and their experience in the treatment of affections of the bowels, especially cholera morbus, which has so close kinship with Asiatic cholera, and were afterwards very successful.

Having thus traced it from city to city, or rather its appearance at various places, for thus far it does not appear to have been introduced by any means which a strict quarantine could have prevented, let us see in what way it spread to country places.

No words of mine can give an adequate idea of the panic which prevailed at that time in city and country. People fled from the city as best they could,—by the few stages which then passed to and fro from country towns, by boats which did the carrying-trade on the Schuylkill and Delaware Rivers, and by wagons of farmers returning from market. When in Philadelphia, no one had spoken to me with confidence in any plan of treatment, and I returned to my home with a feeling of great responsibility and a deep conviction that I was poorly qualified for the earnest duties likely to come before me. On the 4th of August a severe cholera morbus occurred in a woman 60 years of age; and on the 5th, one of Asiatic cholera. I called it *that*, because of the profuse discharges of rice water, the vomiting and cramps of body and limbs, corrugated skin, and cold, clammy surface. The same day I had another case, one mile from the former, in a woman who had not been from her home for a long time, but they were all within a mile of the river. August 7, was called to see a group of Irishmen engaged in digging a canal at Conshohocken, at a place where there were then only a few houses for laboring men, besides the farm-house and barn of Mr. Harry. In this barn I found several men in a sad condition. One was dying, some were drunk, and some evidently quite sick, as well as under the influence of whiskey. I attended pretty faithfully to them for a few days, but, as there was no nurse, and as the thirst of the sick was so great as to cause them to take water every few minutes, to be vomited as soon as taken, my ministrations did no good. One day when I arrived, a dying man told me that when he would ask for water one drunken fellow would dash it on him from a bucket. Three of them died in a few days, and I prevailed on the others to go away. They seemed to be well, but were drinking very much of whiskey. The next day they were all away. Whether I did right in advising them to separate has been to me, ever since, an unsolved problem. The next day, or the day after they left the barn, Dr. Roger Davis, who lived in a very out-of-the-way place, five miles from Norristown, found a sick man on his piazza early in the morning. He wanted medicine, but had waited several hours for the doctor to get up, and by that time was so ill that he could not

travel farther. Dr. Davis made him as comfortable as he could in the barn, but he died in less than twenty-four hours. Dr. Davis had not the least suspicion of anything but cholera morbus. Next day he, Dr. Davis, was sick, and the day after, very sick. A physician saw him, but he was then in a profound collapse, and died a few hours afterwards. The man who had died there reported that he had come from Conshohocken, was one of the group spoken of, and that he had been taken sick a few hours after leaving there, while walking up the river. If it came to Dr. Davis from that man, it would favor the belief in a peculiar poison—germ, shall I say?—which acts very quickly. From this time, August 12, until September 22, it spread over the region in which I practised, giving me twenty-eight more cases, all of whom recovered but two, of whom I will give brief accounts.

N. Leonard, between 40 and 50 years of age, a vigorous man, in good health, living opposite Conshohocken, close to the side of the river, was troubled with diarrhoea and occasional vomiting from the early morning of August 11 (only four days from my first visit to the sick men in the barn, a quarter of a mile away, on the opposite side of the river) until 4 P.M., but he had not kept in the house, nor had he felt that it was a serious illness until at the hour named, when the cramps appeared. At seven o'clock, when I saw him, he was still sitting up, though having cramps, and very often vomiting and purging of that peculiar fluid since known everywhere as "rice-water discharges;" pulse was small, frequent, his voice becoming husky, and his skin perspiring profusely. I attempted to give him my cholera morbus treatment,—salt-water emetic, camphor and opium, calomel, and, externally, frictions and warmth; cold drinks, and ice in small lumps. Here I ought to say that after Dr. Jackson's failure with the hot vapor, and which failed with others also in their small hospitals, he had hollow tin vessels made to fit the thighs, legs, arms, and body, which being filled with hot water were applied. I used these on my poor patient, to check, if possible, his profuse cold perspiration. My efforts for hours were of no avail. I sent miles away for an old physician, who, on being told of the ailment, would not come; then for my brother, Dr. William Corson, of Norristown, with only a year's practice. He came at midnight. All my efforts had been of no avail. Medicine taken by the mouth was quickly rejected, the watery discharges so copious that the bed was thoroughly soaked and they ran through it to the floor. To those who have never seen such a case, a

truthful statement of the amount would be deemed incredible. I speak of it as gallons. Dr. Jackson said he had seen bucketfuls discharged in a few hours from the bowels alone. It was then midnight; the pulse was barely perceptible, the voice had sunk to a whisper, the skin was wet, and cold as the body of the dead, but the mind clear. In this case, as in others in collapse which I saw later, there seemed to be no anxiety about the result, no fear or care about it, save to have relief from cramps. The suffering was fearful: though all we could do we did. Frictions, and the tourniquet to the limbs, were somewhat relieving to the cramps there; but for those in the muscles of the chest and belly—great hard balls, which caused faint cries of agony—we could do nothing. We stood by him hour after hour, and when the morning dawned the night and the patient passed away together. How helpless we had been to relieve! how confused and uncertain as to the proper course to pursue! —the patient in fearful agony from cramps of the muscles of the legs, the belly, and the chest, his skin cold as the dead, even his tongue cold, and yet oppressed with a sense of heat all over his body, and crying for water! water! water! With the clinical thermometer to determine the temperature, and the hypodermic syringe to put anodynes where they would certainly exert their power, we could now have no excuse for allowing a patient's last hours to be so agonizing.

From that time cases followed each other rapidly until the 6th of September, when one, also speedily fatal, occurred, which was so like the one already given that I would not refer to it, save to show the exciting cause.

Samuel Summers, a strong young man, accustomed to work for the farmers, after working all day September 5, went to a "watermelon party," and stayed till midnight, dancing occasionally: next morning was at work at sunrise, as was then the custom. When called to breakfast at seven o'clock, he felt sick, and did not go. In a short time—even before his fellow-workman finished eating—he went home, a distance of only one-eighth of a mile, vomited, had much pain, and copious thin discharges from the bowels. He was several miles from me, so that I did not see him till 10 A.M. Found him then, only two hours after his first feeling pain and nausea, having copious rice-water discharges, much sickness of stomach, vomiting, and strong cramps of the limbs, pulse small, perspiring greatly. He was already passing into collapse. Although I called two other physicians to aid me, one of whom was a man of long practice, it was all to no purpose. I did not leave him till he died, at 10 P.M.

It was just such imprudence as this—indulgence in watermelons, and loss of a

night's sleep—that brought on many cases. There had been no case in that region before his, and the people there had not been greatly alarmed. All my cases, except those above named, thirty in number, got well, but they had not passed beyond the second stage; many of them had severe vomiting, profuse purging, and cramps of the legs, but they were vigorous, fearful of death,—a most encouraging sign to me,—and could bear venesection if deemed necessary. If the pulse was yet unaffected and cramps present, I resorted to it, then gave "Dr. Parrish's Camphor Mixture," or camphor and laudanum, with ice or iced water to allay the fearful thirst; also used mustard externally, or, where the surface was cold, with clammy and shrivelled skin, hot water was used in the tin vessels as recommended by Dr. Jackson. Calomel was given in many cases, for no other reason, I suppose, than that it was believed to be efficient in causing a flow of bile, and that the presence of bile in the stools was regarded as a favorable indication.

Though all whom I attended got well, save those named, I feel that one more experienced in the treatment of disease than I then was might possibly have saved both Leonard and Summers, for Dr. Jackson reports cases which were in a seemingly worse condition when he was called, some of whom recovered, though his means of cure were the same as mine.

Let us hope that the lapse of fifty-two years has given us better means of relief if we should be again called on to confront the disease. Though Drs. Parrish, Jackson, and their followers differed greatly from Dr. Hodge and some others about the pathology of the affection, their treatment was nearly the same. Listening to the crude theories which were sent forth by persons who had never seen a case, but who fancied that it was something pathologically different from any disease they had ever seen before, and acting on these theories, the first few cases were fatal in almost every hospital; but when, more familiar with it, they attended to the symptoms and applied their successful experience for their relief, all of them proved to be fairly fortunate in saving lives. The fatality in Philadelphia was one death to two and a half persons attacked, while in New York it was one to two.

In a subsequent communication I propose to refer particularly to the various methods of treatment then employed,—the use of calomel, venesection, leeches, emetics,—at first so popular,—cathartics, hot vapor-baths, dry heat, ice externally and internally, which were approved by the experience of leading physicians who were engaged in active practice at the time this epidemic under consideration prevailed in Philadelphia.

NOTES ON THE TREATMENT OF CHOLERA DURING THE EPIDEMIC OF 1832.

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TRUE cholera is so like cholera morbus in the exciting causes, the symptoms in the early stages are so similar, while both diseases are so unlike those of affections of all other organs, that we can regard it only as an affection of the mucous membrane of the stomach and intestines; but its course is often so rapid, its mortality so great, its passage from an infected district to other regions, hundreds of miles away, so mysterious and oftentimes so sudden and inexplicable, that the mind is bewildered, making us the more anxious to learn what the peculiar poison is which brings about results so distressing, changes in the system so great, and sweeps away so many lives despite our utmost skill.

The first symptom is nearly always diarrhoea, occurring while apparently in perfect health; then slight pains, followed by vomiting, profuse evacuations, cramps, and collapse. It is, under all its phases, a disease peculiarly of the stomach and bowels. Its varieties, from the first to the last, are only stages of the malady or aggravations of those preceding them.

In the examinations by Drs. Gerhard and Pennock, in the service of MM. Louis and Andral in La Pitié Hospital, the lining membrane of the bowels was always found red in places, and sometimes even, in the lower part of the colon, softened and greatly changed,—the result of congestion and inflammation. I quote from a single autopsy: "The mucous membrane of the large intestine was of a grayish color, at intervals slightly tinged with livid pink in its first third; grayish, livid red, in the eighteen or twenty inches which succeed; then in the last two feet brown, and exhaled a manifestly gangrenous odor." They made many careful examinations, and in all cases the bowels,

large and small, gave evidence of changes due to congestion and inflammation. Prof. George B. Wood, a most careful and accurate observer, wrote, "That an irritation in the stomach and bowels exists in cholera can scarcely be doubted; but examinations of those who die in the cold stage reveal no uniform and unequivocal evidences of inflammation; the injection of the mucous membrane is venous. The mucous membrane, throughout nearly its whole extent, is usually more or less reddened, and the parietes of the bowels are sometimes thickened, owing to the *venous injection* of the inner coat."

Prof. Jackson says of the pathology of the first two periods,—the periods preceding collapse,—"In these stages cholera is an irritation developed primarily in the mucous tissue of the alimentary canal." I shall have occasion to quote more at length from this authority when we speak of the collapsed stage.

I have been thus careful to point to the nature of this disease, to show that at first we have congestion and irritation of the gastric and enteric membrane, oftentimes very slight, and, even when severe, quite generally under control by "appropriate remedies," such as were in common use by physicians, in and out of hospitals, during the stay of the epidemic here. Everywhere the first persons attacked had allowed the premonitory symptoms to exist for hours—days, sometimes—before giving any attention to them: so that when brought to the hospital, or to the attention of the physician elsewhere, they had already passed into the stage of collapse. I shall speak now of the treatment which prevailed in city and country in cases still having a pretty fair pulse, though the vomiting and purging, and even cramps,

were severe. Regarding it as congestion and irritation, venesection was very frequently used in urgent cases; but prior to a resort to it, the camphor mixture, sometimes called "Cholera Mixture of Dr. Parrish," freely given, would set even very threatening cases at rest. This came into very general use, was a most excellent remedy, and to this day has held the reputation then acquired.

The mixture of Dr. Parrish which attained so great favor and has so long been used is as follows:

R Aquæ camphoræ, f $\frac{3}{4}$ iij;
Spt. lavandulæ comp., f $\frac{3}{4}$ i;
Tinct. opii, f $\frac{3}{4}$ i;
Pulv. sacch., 3ij.—M.

Sig.—Dose, a tablespoonful. (The laudanum may be omitted.)

By some druggists it is thus made:

R Aq. camph., 3ij;
Sp. menthæ piperitæ, f $\frac{3}{4}$ j;
Magnesii carb., 3i.—M.

Dose, one tablespoonful.

In many cases emetics were first given to produce free vomiting. The salt-water emetic was much used. One or two tumblersfuls of warm water with salt would quickly "wash out the stomach," as was said. The propriety of adding, by this nauseating, irritating dose, to the already too great irritation was not plain to me; but there was so much talk about the revulsion it produced, that, without knowing where the revulsion was manifested, I fell into line and tried it in a few cases, then abandoned it and opposed its use on the same principle that almost every practitioner opposed drastic cathartics, which then often developed the disease in healthy persons. Camphor in other forms than Dr. Parrish's was much used, as tincture of camphor with laudanum, or solid camphor with opium. Some physicians used the tincture alone,—one drop every five minutes, or five drops every half-hour or hour, —or in other proportions or combinations.

As many patients were so quickly relieved by camphor, some believed it to have a specific effect. A few hours would, in many cases of cholericine (as Dr. Jackson termed the first two stages), suffice to bring relief. When these means failed, and the disease was progressing, bleeding from the arms was generally resorted to, and often with prompt relief. I have often seen the pain subdued, the oppression relieved, and the patient become quiet and lie comfort-

ably, when a few moments before he had been in great suffering and distress.

Drs. Caspar Wister Pennock and W. W. Gerhard wrote of the treatment before collapse as follows: "Febrile excitement should be reduced by bleeding, and, if local pains exist, by leeches; discharges checked by opium. When it has proceeded to cramps and profuse vomiting, blood-letting is advisable if the pulse be not much depressed, and should be carried as far as the strength of the patient will permit. The effect of it in the cases with which we are familiar was very happy."

Dr. Zabriskie, with his five hundred sick paupers, in Bellevue Almshouse, used leeches in his first variety with good results; in the second variety—the "mortal cholera," the same as prevailed in the Paris hospital, where ninety-six out of ninety-seven died—he saved not one out of six cases that he bled, and he did not believe that any treatment would save such cases. I may add here that, when the feebleness of the patient forbade venesection, leeches were used in some cases by Drs. Gerhard and Pennock, because they had observed that "the most severe inflammations very often occur in the intestinal canal."

Dr. H. L. Hodge, late Professor of Midwifery in the University of Pennsylvania, then physician to City Cholera Hospital No. 4, writes, "Should the premonitory symptoms be neglected or injudiciously managed, the sedation of the capillaries is more marked, and there is fulness or oppression of the larger vessels, with the severe consequences already detailed." The remedies already recommended should now be actively exhibited, and will sometimes be adequate for the emergency, by recalling the circulation to the extreme vessels and restoring the secretions; but generally direct evacuation must be employed to relieve the congestion, which resists the natural disposition to reaction and the effect of remedial measures.

"Copious bleeding from the large veins had the most beneficial tendency,—not simply by unloading the vessels, but by thus indirectly facilitating reaction,—manifested by more fulness and activity of the pulse and renewed activity of the capillary circulation. The advantages were generally striking and immediate: the feelings of oppression about the head, heart, lungs, and abdomen were at once relieved; the surface would become warmer,—even

the livid color would be lessened; the vomiting and purging would diminish or disappear, while a warm perspiration would be diffused over the surface, indicative of a similar return of the internal secretions.

. . . It was observed that the blood first drawn was of a very dark color, flowed with difficulty and tardily, even from a large orifice in a large vein, sometimes guttatum, but soon a full stream of almost arterialized blood would sometimes be poured forth with considerable impetus.

"As in these cases the pulse would rise from its depressed condition, becoming full and active as the oppression was ameliorated and as the secretions and heat of the skin returned, large quantities of blood could often be beneficially abstracted: twenty to thirty ounces could frequently be taken from even delicate persons, while from the strong and plethoric I have taken sixty to seventy ounces with great and immediate advantage, and without any reason subsequently to repent of it. The patient was usually found, at a subsequent visit, with a warmer skin, a fuller pulse, and more natural secretions. In cholera maligna we bleed not to diminish excitement, but to relieve oppression."

Dr. D. Francis Condie, so long the able reviewer of medical papers in Dr. Hays's *Journal*, says, "We have found the lancet, more especially cups to the abdomen, an important remedy."

Dr. Samuel Jackson, after giving his treatment of the two early stages by the ordinary remedies to allay pain, diarrhoea, etc., writes, "Whenever the vomiting and purging continued, accompanied with severe pain in the abdomen, then I had recourse to sanguine depletion, either general or local, or both, according to circumstances. General depletion was used in the limited number of cases in which the pulse was full and excited; but in the others, leeches or cups to the abdomen were found safer and better. It is surprising to witness how prompt often is the alleviation and abatement of the symptoms following the application of from thirty to sixty leeches to the epigastrum and the iliac regions. In no instance did I find it necessary in the patients I treated in the first stages to repeat the local depletion.

"In several instances general depletion made but little impression, while a prompt relief ensued upon local depletion.

"General blood-letting is but partially

applicable to the cases of cholera. It should be restricted to those where the constitution is vigorous, and the patient not enfeebled by age, previous disease, or dissipated living."

There is another remedy which at that time was much used in many—I may say in nearly all—diseases, and was exhibited pretty freely in this. Hear what these practitioners say about calomel:

Dr. Jackson gives accurate detailed reports of many cases in all stages, but I cannot find that he used this medicine frequently. When he used it, it was in doses of from only one to four grains, repeated a very few times. He did not speak of it as an essential at all.

Dr. Parrish has left us no account of his opinion in relation to it in any medical essay known to me.

Dr. Zabriskie thought calomel in large doses to purge, and afterwards small ones to salivate, of great value. The drug was used until the stools became green, which occurred in his cases in from four to six hours. His habit was to give ten grains, with half a grain of opium and five grains of kino, every hour. Four doses generally produced the green stools, and then, except in the mortal cholera, the patient convalesced.

Dr. Hodge, after bleeding, treated his patients with mild diaphoretic anodynes, sinapisms, frictions, hot bricks, Cayenne pepper, etc., but he adds, "To fulfil, however, the all-important indication of re-exciting capillary action, no medicine was comparable to calomel. Other remedies were useful in accomplishing this object, but, however rapid in their action, their effects were often trifling and transitory compared to the decided and permanent influence exerted by mercury." He gave calomel in doses of two or three grains, alone or in combination with diaphoretics, every one, two, or three hours, until twenty or thirty grains were given, or the symptoms relieved. "It operates slowly, but very certainly, upon the extreme vessels, augmenting their circulatory and secretory actions, and thus admirably fulfilled the indications in cholera, and was, therefore, the main dependence of the practitioner." It seems, judging from what is said by Drs. Gerhard and Pennock, that mercurials were not used by MM. Andral and Louis at the French hospitals. They say, "Should the discharges be still

abundant, they should be checked with opium, and, if the mercurials possess any efficacy in changing the course of cholera, theoretically we should advise their use at this point: practically, we know nothing of their action in this epidemic."

I cannot close this part of the subject without brief notice of the treatment recommended by Dr. Joseph Ayer, member of the Royal College of Physicians of London, a writer well known many years ago. He had in private practice 219 patients, of whom 176 recovered. (In Philadelphia, of 1175 in private practice, 905 recovered; about the same proportion.)

Dr. Ayer, in the premonitory stage, gave one grain of calomel, with two or three drops of laudanum, every half-hour for five, six, or eight times; then every six hours, or twice a day, for a time. In collapse, he gave a grain in pill every five minutes, and with it a single drop of laudanum in a teaspoonful of cold water. In bad cases, he usually gave two grains of calomel every five minutes for an hour or two, and then he fell back to the ordinary dose of one grain. He used no other remedy,—neither bleeding, opium, nor camphor; no leeches, emetics, stimulants, external heat, or ice. He writes, "With the exception of mustard-plasters to the stomach (which I sometimes ordered and perhaps as frequently forgot) and bags of hot sand to the feet, with a regulated allowance of cold water as drink, I resorted to no other means whatever, not even to a single trial of any other than the calomel and opium." He was thus exclusive so as to know that no other agent assisted in the cure. Well, there was sense in this. When I see a man sending in a prescription composed of eight or more medicines, I feel that he is a useless if not a dangerous practitioner.

I come now to the cold water and ice treatment. There was much difference of opinion in relation to the use of these articles. At that time (1832) cold water was not used at all by many physicians in *any disease* as a daily drink. As regards myself, I have never used warm drinks in *any case*, save when cold ones were not desired by the patient, from the first day that I began practice till the present moment. In the cholera time we all in this region used cold drinks. Who could use any other, when all others were disgusting to the poor patient, suffering a

horrible thirst and crying for cold water? And yet it sometimes seemed useless, for it was instantly returned, and the cry was for more. We really had occasionally to prescribe the amount and the times when it should be used. Then we had scarcely a single ice-house in the neighborhood; now we have scores of them, and can by substituting ice for the cold water satisfy and relieve the patient.

Dr. Jackson commenced in his first cases to treat his patients with warm stimulating drinks, aided by external heat, such as the warm vapor-bath, then much in vogue. A patient, among the first brought in, was in a collapsed state, cold as death, and no pulse at the wrist, but she resisted the warm treatment,—“had,” he said, “an instinctive abhorrence of them: brandy, wine, ammonia, etc., were attempted to be forced on her, but her resistance could not be overcome; her constant exclamation was for cold drinks, and against all warm applications. ‘Heat will murder me!’ was her constant exclamation: ‘give me cold—cold!’

“Nature is an instructor whose lessons are to be preferred to scholastic authorities, and the instinctive sensations of the organs are her language. The effervescent draught, iced, and iced water, took the place of stimulants,—were taken with delight, and largely demanded.”

I need only say that the patient recovered.

I cannot, though, refrain from letting Dr. Jackson speak again: “Until this case the patients received into the various hospitals had been treated with steam baths or heated vapor.” (He seems to forget Dr. Parrish’s trials with cold.) “I had assisted my associates charged with the care of these establishments, and it was the general impression that this means hastened the general collapse by the profuse discharge it caused. None of the patients survived over a few hours. This case made a strong impression on me, and gave a new direction to the treatment I pursued.”

It is not out of place here to refer to the use of cold *externally* in reduced conditions of the system. I truly regret that we cannot have the testimony of Dr. Parrish on this subject, for he seems to have tried it somewhat. As there is nothing so impressive as having a case before us, let me speak of one that had received the attention of Drs. Meigs, Beattie, and Jackson

on Friday afternoon, and of whom the latter thus writes: "Saturday, August 25, 8 o'clock A.M.: patient alive, though barely animated; no pulse; universally cold; breath cold; voice nearly extinct; labial circulation continues, though very feeble; and the blood pressed from the veins slowly fills them again."

"Reflecting on the condition of this patient,—the vital movements nearly extinct, the circulation almost at a stand, the vital forces reduced to the lowest ebb,—we were struck with its resemblance to that which ensues from exposure to a low temperature. Though the causes are different, yet the condition is analogous in the two cases. In this state heat and powerful stimulants extinguish and do not reanimate the vital movements, or, if they be roused, it is only a momentary effort, terminating speedily in irremediable exhaustion.

"We were struck with another analogy. The choleraic patient advanced to the condition of the case before us, with his blood but partially oxygenated, is reduced in the scale of vitality, and approaches, in the state and nature of his vital forces, to the animals of cold blood, or having a single ventricle. In all such animals a degree of heat equal to that of the human body is oppressive, numbing, gives a strong tendency to asphyxia, while a degree of temperature which is often that developed by fever in the human organism is productive of fatal asphyxia in a few moments. In those animals also, when placed in mediums destitute of oxygen, if the temperature be elevated asphyxia is rapidly induced. The same animals in a low temperature approaching the freezing-point will survive a considerable period, and may be reanimated after a much longer suspension of their vital functions.

"Acting on these suggestions, I took a piece of ice and rubbed with it a hand and arm for a minute or two, following it up with dry frictions, first with my hand and then with a dry cloth. An instant change took place in the color of the skin. From a cerulean hue it became pink, and the sensation of cold was most agreeable to the patient. Encouraged by this experiment, the same process was extended to the whole body and repeated every half-hour. The temperature of the whole body soon improved, it acquired an agreeable warmth, and the skin felt dry and more

natural. The treatment, with ice internally administered and the iced saline solution given in small quantities every few minutes, was persisted in during the day." The patient recovered, the convalescence beginning on the 27th. In his "Observations," he adds, "I have seen no other patients recover from so prostrate and apparently hopeless a condition as the subject of this case." We should not forget this case. A man in the very arms of death. Patient alive, though barely animated, says Dr. Jackson. Did he resort to the fashionable life-giving (!) whiskey? No! No!

Dr. Hodge says, "The free indulgence in cold drinks is productive of much mischief, by increasing the load and oppression at the praecordia and aggravating the vomiting; and thus the exhaustion of the patient is increased by the quantity of fluid and by the sedative influence of cold on the gastric mucous surface. But in *ice* we have a most excellent substitute. Ice, in small quantities, allowed to dissolve in the mouth, is exceedingly grateful. It quiets the morbid sensation, and moderates the restlessness, jactitation, and anxiety which do so much mischief."

I cannot leave this part of the subject without a word upon opium. Of this most valuable drug I need not say much more than that all relied on it as the one indispensable medicine. In the stages preceding collapse it often by itself, or with camphor, effected cures in very severe cases. As the value of this agent is fully appreciated at the present day, I need not discuss it further.

Before taking up the consideration of the treatment by other means than those mentioned, I may here speak of some peculiar pathological views upon which they were based. And first let me state Dr. Hodge's views of the nature of cholera. The opinions of the other physicians named in this paper have already been presented. They regarded irritation and inflammation of the mucous membrane of the alimentary canal as the cause of all the symptoms. Dr. Hodge regarded the condition there as one of *sedation*, not irritation. He says, "If the collapsed stage be regarded as the true type of the complaint, the evidence of sedation or diminution of action in the general system is undeniable. The cold and livid surface, the tearless eye, the pallid and cold tongue, the coldness of

the breath, the weak, fluttering, almost imperceptible pulse, leave no mind in doubt respecting the prostration of vital excitement in all, or nearly all, the organic tissues.

"It is, however, contended that this sedation of that stage is a secondary condition, resulting not directly from the original epidemic cause, but indirectly from the occurrence of severe local irritation or inflammation; that vital excitement is so concentrated in a particular tissue, the gastro-intestinal mucous membrane, that torpor or prostration of the other tissues ensues. That this sedation is the direct and immediate consequence of the epidemic influence is, I think, fully proved by an examination of the symptoms preceding and accompanying the primary stage.

"There is no evidence at any time of vascular excitement, no frequency or irritation of the pulse, no dryness or heat of the skin, tongue, or any other accessible tissue. On the contrary, in many instances, long before there is any decided manifestation of the disease to the unobserving, and of course prior to any evacuations, the skin will be found pallid, and of a darker tinge than natural, the features contracted, the tongue pallid, the appetite impaired, the urine diminished in quantity, the stools of a light color. There is no evidence whatever of general excitation of the circulation at any period of the disease, whether of a mild or severe type." Dr. Hodge has much more on the subject; but this must suffice for the present.

Dr. Jackson, in opposition to these views, wrote, "In the first periods there are no evidences of enfeeblement of nervous power; on the contrary, the cramps of the voluntary muscles and the spasms of the muscular tissue of the alimentary canal are direct indications of an opposite condition. They indicate excitement and augmented energy of the nervous stimulations exciting the muscular power. The muscular power of patients is remarkable, considering the great intensity of the disease."

While these two eminent physicians, and others, who agreed with the one or the other, differed in their views of the affection, their treatment was nearly the same. I deeply regret that Dr. Parrish, whose counsel we so eagerly sought and whose teachings we so implicitly followed, has left us no testimony in relation to his

pathological views and to the value of blood-letting. It is, however, well known that he used the lancet freely in cases where the pulse was readily felt at the wrist.

The eloquent and enthusiastic Dr. C. D. Meigs, then physician to Cholera Hospital No. 10, the teacher to whom thousands have since listened with delight, whose style was peculiarly his own, and whose courage dared give expression to his thoughts, has left us a record of his views. He did not believe in the inflammatory nature of cholera,—did not even believe that it was an affection of the bowels. I have not space here to do him full justice, to give proofs and illustrations of his interesting theory. I will essay to do it briefly. He regarded the brain as the *Being*,—the *Man*. All else—limbs and organs—were servants, moved and compelled to do duty by that nervous mass. In its integrity all moved, all worked in harmony; but when it was touched by the cholera-poison its motor force was increased, and then came disorder everywhere; all the diseased phenomena witnessed in cholera resulted from the poison acting on the brain. The rice-water discharges which issued in full streams from stomach and bowels, and the sweat which came like rain from the skin, leaving but strings of clotted residue in the narrowed blood-vessels, made so by the condensing motor force, were forced through the parietes of every blood-vessel, from the mighty aorta to the finest venule of the body, just as the milk-maid presses the whey from the curd through the meshes of a linen cloth, leaving only a dry mass.

I fear this may misrepresent him. Space or no space, he shall have fair play; he shall be heard. He writes, "Oken asserts that the *animal* is naught but nerve. Can you gainsay him? From the nervous mass, called brain, issue two, and only two, forces, one sensor, the other motor. Cholera is an exaggerated intensity of the motor force. Conceive, if you can, this exaggeration, then you will perceive in the malady a state of the nervous mass, which has resulted in the gradual or the sudden condensation of all the living solids,—not the muscles alone, which are racked with cramps or spasms, whether those of the trunk or limbs, or those of the alimentary canal, the bladder, uterus, etc., but condensation of every artery, arteriole, capillary, and venule, of

the cellular tela, of the skin, the parenchyma of the lungs, the acini of the liver, and all other textures. Every organ, every granule, every tissue in a general anatomy, and every molecule, tends toward condensation under the stimulation of cholera-poison. So that the whole living mass is, as it were, under a squeeze,—the cholera-squeeze."

"It is a state of [hyper]esthesia, and can be relieved only by anaesthetics. Of *anaesthetics* there are but two dependable ones in the world,—opium and the lancet."

Such were his views: what was his practice? By quoting a single case I shall make it plain:

"Salvador, an athletic Sardinian, was pulseless, algid, blue, voiceless; skin puckered and adherent to the periosteum of the phalanges; the tongue cold, and mucous membrane of everted lips cholera-blue. He had been under the cholera-squeeze. There was no time for opium. I tied up his cold arm, and opened the median vein. It would not bleed. I drew out a long veno-morphous clot, and the blood trickled down into the bowl. I rubbed his arm and hand, and it began to flow, the perishing man being all the while as composed and sensible as if in perfect health." The rest I sum up. He fainted; was revived; the anaesthesia was perfect, and from that moment he convalesced.

Here we again see that a dissent from the inflammation theory did not lead to a different practice, though it is proper to say that Dr. Meigs opposed all emetics and cathartics. The condition of the blood deprived of its water led to the idea that if a solution of the saline ingredients in warm water, in the proportion which they hold to the serum in normal blood, could be thrown into the veins, the clotted blood might be made fluid, the fulness of the vessels be restored, and the circulation be established even in the extremities, and the heart be stimulated to increased action. When this idea was acted on, how wonderful the results!—the unconscious and dying man restored, as if by magic, to life and comfort. Dr. Thomas Latta, of Leith, Scotland, in 1832, before it reached us, by resorting to this expedient saved some cases from impending death. I will give one case. (Before doing so, let me say that Dr. Jackson reports the temperature of the body in cases of extreme collapse

as 90°, 91°, 92°, and even in some as low as 84° in the mouth.)

Dr. Latta says, "If the temperature of the water injected be so low as 100°, it produces an extreme sense of cold, with rigors; and if it reach 115°, it suddenly excites the heart, the countenance becomes flushed, and the patient complains of great weakness."

Numerous trials were made before the amount to be injected and the proper temperature of it were ascertained. Of his first case he thus speaks: "An aged woman had apparently reached the last moments of her earthly existence. I feared I should be unable to get my apparatus ready ere she expired. Having inserted a tube into the basilic vein cautiously, anxiously I watched the effects. Once after ounce was injected, but no visible change was produced. Still persevering, I thought she began to breathe less laboriously; soon the sharpened features and sunken eye and fallen jaw, pale and cold, bearing the manifest impress of death's signet, began to glow with returning animation; the pulse, which had long ceased, returned to the wrist; at first small and quick, by degrees it became more and more distinct, fuller, slower, and firmer, and in the short space of half an hour, when six pints had been injected, she expressed in a firm voice that she was free from all uneasiness, actually became jocular, and fancied all she needed was a little sleep; her extremities were warm, and every feature bore the aspect of comfort and health." As he was weary, he left her in charge of another, who failed to watch her closely, and she again fell into collapse, and died. It should have been repeated, as the following case will show:

"A woman, aged 50, on the 13th instant, at 4 A.M., was seized in the most violent form, and by half-past nine reduced to a most hopeless state: pulse gone at the axilla. I injected one hundred and twenty ounces, when, like the effects of magic, instead of the pallid aspect of one whom death had sealed as his own, the vital tide was restored, and life and vivacity returned; but diarrhoea recurred, and in three hours she again sunk. One hundred and twenty ounces more were injected, with the same good effect.

"In this case three hundred and thirty ounces were so used in twelve hours,

when reaction was completely re-established, and in forty-eight hours she smoked her pipe, free from distemper. She recovered."

What success our Philadelphia physicians had with intra-venous injections is not known to me. In reading these cases I was amazed that so much fluid could be thrown into the veins and yet not distend them. It shows what a large amount of blood circulates in the body when in health. Dr. Jackson says we have five hundred ounces. I must not neglect to say that the solution used by Dr. Latta was composed of from two to three drachms of muriate of soda and two scruples of the subcarbonate of soda, with six pints of water. Our timid friends who think "no one has a drop of blood to spare," and who stand by the suffering patient and see him die rather than relieve him by bleeding him to unload the vital organs, oppressed by congestion or their functions destroyed by inflammation in acute diseases, should from these cases be encouraged to believe that they might, in inflammatory diseases, draw even large quantities of blood at times without endangering the life.

Of the physicians spoken of in this paper not one believed in its contagious character. Nor did they regard quarantine as being of any value. But, though holding these opinions, I am not aware that they favored the doctrine of Mojón, a professor in the medical department of the University of Genoa. In 1832, when Dr. Mojón learned that the cholera prevailed in Paris, he hastened to that city to investigate the cause and nature of the disease. He afterwards published an essay in which he advocated the doctrine (recently revived by Koch in more precise terms) that "the efficient cause of cholera consists in animalcula floating in the atmosphere, and which, penetrating into the system through all the pores" [how like the report of Prof. H. C. Wood about the Wisconsin diphtheria!] "situated on the internal and external surfaces, give rise to the symptoms." His essay is an exceedingly interesting one, and his doctrine will, no doubt, be now regarded with favor; and should it be found to be true (by discovery with our improved means of observing minute germs), let us not forget to give due credit to Dr. Mojón, who, though not the originator of the idea,

more than any other man clearly presented it to the people.

While the cholera was sweeping off hosts of victims in Montreal, there one day appeared in that city a man strangely attired, and with a full beard,—then a most unusual thing,—mounted on a Texas pony (or, as they are called, mustang), leading some others, and followed by several dogs. It was a novel sight in the city, and as he passed from street to street the "wonder grew," and the questions were, "Who is he? Whence came he?" It was soon known that he claimed to be able to cure the cholera. The city was filled with mourning and terror; people were anxious to receive aid from whatever source it might come. Some went to his quarters for the cure; others he visited at their homes; some cures were effected; the excitement became intense; crowds flocked to him; his exploits were heralded all over the country, and the efforts of physicians paled before his reputed successes. The disease soon ran its course in Montreal, and the people were ready to believe that the mysterious doctor had caused its decline. There was a public meeting to express the grateful feeling of the citizens for the timely arrival and eminent services of the cholera-doctor, and he was voted the freedom of the city. Other places applied for his services, and he was conveyed from the city to give his remedy and life-giving services to bands of Indians whom the disease had reached. The cholera passed away, the cholera-doctor's services were no longer needed, winter and spring had come and gone, and I had forgotten the mysterious stranger, his dogs and horses, when by chance I was brought face to face with them. He had come to Spring Mill to see his friend Peter Légaux, a French surgeon, who had managed the property of the luckless "Philadelphia Vineyard Company." Though Mr. Légaux was deceased, the stranger was, as in former times, a welcome guest in the home of the daughter. On meeting him, I found a man of middle age, tall, thin, calm and dignified in bearing, dressed in light linen clothes. At night he slept on the floor without a bed. Whatever cover was over him was of linen, so that the "electricity could have a fair chance to circulate around him." There were many peculiarities about him, but he was not an uninteresting man. When I told him that

we had heard, even at this great distance, of the success of his labors in Canada, he appeared to be gratified, and told me much of his doings there. He said that his name was Stephen Ayres, that he was a graduate of Princeton College, a licensed physician of the State of New Jersey, and for the past few years a resident of Texas, then to us almost an unknown region. The remedy used by him was simply pulverized charcoal mixed with lard. It was prepared by himself, and given to all with special directions to be followed to the very letter. He was a shrewd man, and, while he affected to have unbounded confidence in the value of his remedy, he was not blind to the effect which his mysterious manners and movements had on the minds of the people. Charcoal, however, was not then a

new remedy, as many used it in bowel affections and gastric disorders.

In this long and, to some, I fear, wearisome paper I have desired to present to the profession of to-day the views and practice of some of the eminent men—now no longer with us—who, fifty-two years ago, met a disease new to them and fought it with the weapons at their command. It is pleasant to record the testimony of men so justly eminent. It is instructive to ponder the results they have recorded,—patients in the embrace of death brought back to life, sometimes by venesection, sometimes by being rubbed all over with ice, sometimes by quarts of warm water being forced into their veins. Though I have made long extracts, my regret is that I could not present all they have written.

